

List of Contents

NUMBER 1

In this issue, the special topic is VISUAL COMPUTING Guest Editor: Markus Gross

Pijush K. Ghosh	1	Computers & Graphics Best Paper Award (1993)
		Visual Computing
Markus Gross	3	Guest Editor's Introduction
Hansrudi Noser, Olivier Renault, Daniel Thalmann, and Nadia Magnenat Thalmann	7	Navigation for digital actors based on synthetic vision, memory, and learning
Yoshihisa Shinagawa, Tosiyasu L. Kunii, Hideyuki Sato, and Masumi Ibusuki	21	Modeling contact of two complex objects, with an application to characterizing dental articulations
Gabriele Lohmann	29	Analysis and synthesis of textures: A co-occurrence-based approach
D. Tost, A. Puig, and I. Navazo	37	A volume visualization algorithm using a coherent extended weight matrix
M. H. Gross, L. Lippert, A. Dreger, and R. Koch	47	A new method to approximate the volume-rendering equation using wavelet bases and piecewise polynomials
Detlef Ruprecht, Ralf Nagel, and Heinrich Müller	63	Spatial free-form deformation with scattered data interpolation methods
André Gagalowicz	73	Tools for advanced telepresence systems
Th. Roß, H. Handels, U. Breuer, and K. Szabó	89	3D Visualization of microvascular blood vessel networks
R. Zewe and HJ. Koglin	97	A method for the visual assessment of overhead lines
C. Braun, T. H. Kolbe, F. Lang, W. Schickler, V. Steinhage, A. B. Cremers, W. Förstner, and L. Plümer	109	Models for photogrammetric building reconstruction
Eihachiro Nakamae and Katsumi Tadamura	119	Photorealism in computer graphics—Past and present

- Robert F. Erbacher, Georges Grinstein, John Peter Lee, Haim Levkowitz, Lisa Masterman, Ron Pickett, and Stuart Smith
- 131 Exploratory visualization research at the University of Massachusetts at Lowell
- A. Hildebrand, L. P. Magalhães, J. M. de Martino, F. Seibert, R. Strack, C. L. Tozzi, and S. T. Wu
- 141 Towards a visual computing and communication reference model

Chaos and Graphics

Ben Goertzel

151 Rapid generation of strange attractors with the eugenic genetic algorithm

Richard L. Bowman

157 Fractal metamorphosis: A brief student tutorial

Announcements

- 165 Past/future issues
- 167 List of 1994 reviewers
- 169 Frontiers in Computer Graphics Technology and Applications: Global Enterprises and Global Cooperation
- 170 CAPE '95: The Fifth International Conference on Computer Applications in Production and Engineering
- 171 6th IFAC/IFIP/IFORS/IEA Symposium on Analysis, Design and Evaluation of Man-Machine Systems
- 172 Eurographics '95: Graphics Multimedia Virtual Reality
- 173 CAAD Futures '95
- 174 CAD/Graphics '95: The Fourth International Conference on CAD & CG
 - I Software Survey Section

NUMBER 2

In this issue, the special topics are

COMPUTER GRAPHICS IN SCANDINAVIA Guest Editor: Lars Kielldahl

P. Dewilde

GRAPHICS HARDWARE Guest Editor: Paul Lister

Computer Graphics in Scandinavia Lars Kjelldahl 177 Guest Editor's Introduction Konrad Tollmar and 179 The design and building of the graphic user inter-Yngve Sundblad face for the collaborative desktop Mikael Jern 189 Custom widgets for interactive visualization using X and Motif Lars Kjelldahl and 199 A study on how depth perception is affected by **Martin Prime** different presentation methods of 3D objects on a 2D display Morten Dæhlen and 203 Matrix decomposition and data reduction Per Gunnar Holm Henrik Wann Jensen and 215 Photon maps in bidirectional Monte Carlo ray trac-Niels Jørgen Christensen ing of complex objects A. Dolenc 225 Rapid recipes for parametric surface models Graphics Hardware **Paul Lister** 237 Guest Editor's Introduction 239 M-Buffer: A flexible MISD architecture for advanced Bengt-Olaf Schneider and Jarek Rossignac graphics Derek Coppen, David Hawes, 247 A distributed frame buffer for rapid dynamic Mel Slater and changes to 3D scenes **Allan Davison** H. Laporte, E. Nyiri, 251 A graphics system based on quadrics M. Froumentin and C. Chaillou Günter Knittel 261 A VLSI-design for fast vector normalization C. Renaud, F. Bricout and 273 Massively parallel hemispherical projection for progressive radiosity E. Leprêtre 281 A parallel image-rendering algorithm and architec-Li-Sheng Shen, Ed F. Deprettere and ture based on ray tracing and radiosity shading

Yong Zhou, Weihai Chen

and Zesheng Tang

297 On the design of a real-time volume rendering J. Smit, H. J. Wessels, A. van der Horst and engine M. J. Bentum Martin White. 301 Graphics ASIC design using VHDL Marcus D. Waller. Graham J. Dunnett. Paul F. Lister and Richard L. Grimsdale Chaos and Graphics Julien C. Sprott and 309 Automatic generation of general quadratic map Clifford A. Pickover basins Richard L. Bowman 315 Evaluating pseudo-random number generators Education Lars Kjelldahl and 325 Editorial José Teixeira Werner Hansmann 327 Computer graphics curricula for a wide range of disciplines Jeffrey J. McConnell 331 Computer graphics education: Issues from multiple perspectives **Announcements** 335 Past/future issues 337 GraphiCon '95: The 5th International Conference on Computer Graphics and Visualization in Russia 339 Eurographics '95: Graphics • Multimedia • Virtual Reality 340 CAAD Futures '95 341 CAD/Graphics '95: The Fourth International Conference on CAD & CG I Software Survey Section **NUMBER 3** Peter R. Bono 343 Introduction by the Associate Editor Technical Section D. J. Walton 345 Point normal interpolation for stereolithography and D. S. Meek modelling

355 An elaborate ambiguity detection method for

constructing isosurfaces within tetrahedral meshes

		Contents
Andrew D. H. Thomas and Michael G. Rodd	365	Verifying machine vision systems by digital montage
Marie-Andrée Jacob	373	Transformation of digital images by discrete affine applications
Anis Limaiem and François Trochu	391	Geometric algorithms for the intersection of curves and surfaces
B. Pharasi	405	Connected components labelling using murray polygons
D. Ghazanfarpour and J. M. Dischler	413	Spectral analysis for automatic 3-D texture generation
H. N. Ng, R. L. Grimsdale and W. G. Allen	423	A system for modelling and visualization of cloth material
Salvador Bayarri	431	Computing non-planar perspectives in real time
Thomas de Araujo Buck, Hans-Heino Ehricke, Wolfgang Strasser and Lennart Thurfjell	441	3-D segmentation of medical structures by integration of raycasting with anatomic knowledge
Keith Briggs	451	Chaos and Graphics A torus map based on Jacobi's sn
Helen Qammar and A. Venkatesan		Manifolds and control of chaotic systems
		Education

Frederik W. Jansen and Peter R. van Nieuwenhuizen	461	Education Computer graphics education at Delft University of Technology
P. Brunet, R. Juan-Arinyo, I. Navazo, D. Tost and S. Vila	467	Computer graphics at the Universitat Politècnica de Catalunya

John D. Reid	475	Short Technical Note Visualizing cross section forces	
	481	Announcements Past/future issues	

483	International (ISSV)	Symp	osiun	n on	Scientific	Visu	alization	
484	CAD/Graphics	s '95:	The	Fourt	h Internat	ional	Confer-	

484	CAD/Graphics	'95:	The	Fourth	International	Conter-
	ence on CAD	& CG				

486 IEEE Visualization '95—Call for Participation

488 International Conference on Engineering Computation and Computer Simulation (ECCS '95)

NUMBER 4

In this issue the special topic is

COMPUTER GRAPHICS ART Guest Editor: Carl Machover

Carl Machover	489	Computers Graphics Art Guest Editor's Introduction
A. Michael Noll	495	The beginnings of computer art in the United States: a memoir
Richard Helmick	505	Virtues of verisimilitude in design and art
Maureen Nappi	509	Aesthetic intention, technology and the art praxis
Stephan Meyers, Ellen Sandor and Janine Fron	513	PHSColograms [®] and rotated PHSColograms
Clifford A. Pickover	523	The loom of creation
Lillian F. Schwartz	529	Morphing the three faces of Mona: the decision-making steps Leonardo used to create his <i>Mona Lisa</i>
Thomas A. Albert and Dick E. Slaaf	541	Technical Section A rapid regional filling technique for complex binary images
Shao Lejun and Zhou Hao	551	A new common fill algorithm for outlined character image generation
Nikola Guid, Črtomir Oblonšek and Borut Žalik	557	Surface interrogation methods
Fergal Somers, Ghee S. Teo and Francis Neelamkavil	575	Object-oriented implementation of the OSF/Motif $^{\text{TM}}$ widget set in Eiffel
Ken Brodie, Petros Mashwama and Sohail Butt	585	Visualization of surface data to preserve positivity and other sinple constraints
F. Feito, J. C. Torres and A. Ureña	595	Orientation, simplicity, and inclusion test for planar polygons
Chi-Yen Huang and Kuo-Liang Chung	601	Transformations between bincodes and the <i>DF</i> -expression

Chaos and Graphics

Clifford A. Pickover 611 The crying of fractal Batrachion 1,489

Peter E. Beckmann

617 On the problem of visualizing point distributions in high dimensional spaces

Education

S. C. Maddock

631 Personal CAL workbooks: the next chapters

Announcements

- 637 Past/future issues
- 639 CAD/GRAPHICS '95: The Fourth International Conference on CAD & CG
- 641 IEEE Visualization '95-Call for Participation
- 643 International Conference on Engineering Computation and Computer Simulation (ECCS '95)
- 644 IEEE Virtual Reality Annual International Symposium 1996 (VRAIS '96)—Call for Participation
- 645 CSG '96—Set-theoretic Solid Modelling: Techniques and Applications—Conference Announcement and Call for Papers
- 647 The Third IEEE International Conference on Multimedia Computing and Systems—Call for Participation
- 648 CG International '96
- 649 1996 Pacific Workshops on Distributed Multimedia Systems (DMS '96)—Call for Participation

NUMBER 5

In this issue the special topic is ARCHITECTURES FOR VOLUME RENDERING Guest Editor: Wolfgang Straßer

Wolfgang Straßer	Architectures for Volume Rendering 651 Guest Editor's Introduction
Günter Knittel	653 A scalable architecture for volume rendering
Hanspeter Pfister, Frank Wessels and Arie Kaufman	667 Gradient estimation and sheared interpolation for the cube architecture
Martin Margala,	679 A 33 MHz 16-bit gradient calculator for real-time

volume imaging

Martin Margala,
Nelson G. Durdle,
Scott Juskiw,
V. James Raso
and Doug L. Hill

Scott Juskiw, Nelson G. Durdle, V. James Raso and Doug L. Hill

Contents

685 Interactive rendering of volumetric data sets

- Michael C. Doggett and Graham R. Hellestrand
- 695 A hardware architecture for video rate smooth shading of volume data
- T. Günther, C. Poliwoda, C. Reinhart, J. Hesser, R. Männer, H.-P. Meinzer and H.-J. Baur
- 705 VIRIM: a massively parallel processor for real-time volume visualization in medicine

C. E. Prakash and S. Manohar Technical Section
711 Volume rendering of unstructured grids—a voxelization approach

Adelene Ng

727 Assessment of five radiosity acceleration techniques

Edward Mascarenhas and Vernon Rego

739 An architecture for visualization and user interaction in parallel environments

Elizabeth Bradley

Chaos and Graphics
755 Causes and effects of chaos

David John Nettleton and Roberto Garigliano 779 Evolving fractals

Announcements
783 Past / future issues

- 785 IMC '96—Information Visualization and Mobile Computing
- 786 IEEE Virtual Reality Annual International Symposium 1996 (VRAIS '96)—Call for Participation
- 787 CSG '96—Set-theoretic Solid Modelling: Techniques and Applications—Conference Announcement and Call for Papers
- 789 The Third IEEE International Conference on Multimedia Computing and Systems—Call for Participation
- 790 CG International '96
- 791 1996 Pacific Workshop on Distributed Multimedia Systems (DMS '96)—Call for Participation

NUMBER 6

J. Encarnação

iii In Memoriam: Wolfgang Krüger 1942-1995

Technical Section

Chen Zhou, Renben Shu, 793 Selectively and Mohan S. Kankanhalli

793 Selectively meshed surface representation

5

Jung-Hong Chuang and Woan-Chiaun Lee	805	Efficient generation of isosurfaces in volume rendering
Takashi Watanabe, Akiko Tashiro and Seizo Fujii		Estimation of three-dimensional objects from orthographic views with inconsistencies
Maurice Dohmen	831	A survey of constraint satisfaction techniques for geometric modeling
Phil Graham, S. Sitharama lyengar and Si-Qing Zheng	847	Improved recursive bisection line drawing algorithms
A. F. Lennings, J. C. Peters and J. S. M. Vergeest	861	An efficient integration of algorithms to evaluate the quality of freeform surfaces
L. Miguel Encarnação	873	Adaptivity in graphical user interfaces: an experimental framework
Hollister David	885	Chaos & Graphics Two fractals based on Keplerian solids
Barbara Mones-Hattal and Evans Mandes	889	Education Enhancing visual thinking and learning with computer graphics and virtual environment design
	895	Announcements Past/Future Issues
	897	IEEE Virtual Reality Annual International Symposium 1996—Call for Participation
	898	CSG '96—Set-theoretic Solid Modelling: Techniques and Applications—Conference Announcement and Call for Papers
	900	The Third IEEE International Conference on Multi- media Computing and Systems—Call for Participation
	901	CG International '96
	902	1996 Pacific Workshop on Distributed Multimedia Systems (DMS '96)—Call for Participation
	1	Volume 19 List of Contents and Author Index
	XV	Software Survey Section



AUTHOR INDEX

Albert T. A., 541 Allen W. G., 423 de Araujo Buck T., 441

Baur H.-J., 705 Bayarri S., 431 Beckmann P. E., 617 Bentum M. J., 297 Bono P. R., 343 Bowman R. L., 157, 315 Bradley E., 755 Braun C., 109 Breuer U., 89 Bricout F., 273 Briggs K., 451 Brodlie K., 585 Brunet P., 467 Butt B., 585

Chaillou C., 251 Chen W., 355 Christensen N. J., 215 Chuang J.-H., 805 Chung K.-L., 601 Coppen D., 247 Cremers A. B., 109

Dæhlen M., 203
David H., 885
Davison A., 247
Deprettere E. F., 281
Dewilde P., 281
Dischler J. M., 413
Doggett M. C., 695
Dohmen M., 831
Dolenc A., 225
Dreger A., 47
Dunnett G. J., 301
Durdle N. G., 679, 685

Ehricke H.-H., 441 Encarna Encarnação L. M., 873 Erbacher R. F., 131

Feito F., 595 Förstner W., 109 Fron J., 513 Froumentin M., 251 Fujii S., 815

Gagalowicz A., 73 Garigliano R., 779 Ghazanfarpour D., 413 Ghosh P. K., 1 Goertzel B., 151 Graham P., 847 Greinstein G., 131 Grimsdale R. L., 301, 423 Gross M. H., 3, 47 Guid N., 557 Günther T., 705

Handels H., 89 Hansmann W., 327 Hao Z., 551 Hawes D., 247 Hellestrand G. R., 695 Helmick R., 505 Hesser J., 705 Hildebrand A., 141 Hill D. L., 679, 685 Holm P. G., 203 van der Horst A., 297 Huang C.-Y., 601

Ibusuki M., 21 Iyengar S., 847

Jacob M.-A., 373 Jansen F. W., 461 Jensen H. W., 215 Jern M., 189 Juan-Arinyo R., 467 Juskiw S., 679, 685

Kankanhalli M. S., 793 Kaufman A., 667 Kjelldahl L., 177, 199, 325 Knittel G., 261, 653 Koch R., 47 Koglin H.-J. 97 Kolbe T. H., 109 Kunii T. L., 21

Lang F., 109 Laporte H., 251 Lee J. P., 131 Lee W.-C., 805 Lejun S., 551 Lennings A. F., 861 Leprêtre E., 273 Levkowitz H., 131 Limaiem A., 391 Lippert L., 47 Lister P. F., 237, 301 Lohmann G., 29

Machover C., 489 Maddock S. C., 631 Magalhães L. P., 141 Mandes E., 889 Männer R., 705 Manohar S., 711 Margala M., 679 de Martino J. M., 141 Mascarenhas E., 739 Mashwama P., 585 Masterman L., 131 McConnell J. J., 331 Meek D. S., 345 Meinzer H.-P., 705 Meyers S., 513 Mones-Hattal B., 889 Müller H., 63

Nagel R., 63 Nakamae E., 119 Nappi M., 509 Navazo I., 37, 467 Neelamkavil F., 575 Nettleton D. J., 779 Ng A., 727 Ng H. N., 423 van Nieuwenhuizen P. R., 461 Noll A. M., 495 Noser H., 7 Nyiri E., 251

Oblonšek Č., 557

Peters J. C., 861 Pfister H., 667 Pharasi B., 405 Pickett R., 131 Pickover C. A., 309, 523, 611 Plümer L., 109 Poliwoda C., 705 Prakash C. E., 711 Prime M., 199 Puig A., 37

Qammar H., 455

Raso V. J., 679, 685 Rego V., 739 Reid J. D., 475 Reinhart C., 705 Renaud C., 273 Renault O., 7 Rodd M. G., 365 Roß Th., 89 Rossignac J., 239 Ruprecht D., 63

Sandor E., 513
Sato H., 21
Schickler W., 109
Schneider B.-O., 239
Schwartz L. F., 529
Seibert F., 141
Shen L.-S., 281
Shinagawa Y., 21
Shu R., 793
Slaaf D. W., 541
Slater M., 247
Smit J., 297
Smith S., 131
Somers F., 575
Sprott J. C., 309
Steinhage V., 109
Strack R., 141
Strasser W., 441, 651
Sundblad Y., 179
Szabó K., 89

Tadamura K., 119
Tang Z., 355
Tashiro A., 815
Teixeira J., 325
Teo G. S., 575
Thalmann D., 7
Thalmann N. M., 7
Thomas A. D. H. 365
Thurfjell L., 441
Tollmar K., 179
Torres J. C., 595
Tost D., 37, 467

Tozzi C. L., 141 Trochu F., 391

Vila S., 467

Wu S. T., 141

Ureña A., 595

Žalik B., 557 Zewe R., 97 Zheng S.-Q., 847 Zhou C., 793 Zhou Y., 355

Venkatesan A., 455 Vergeest J. S. M., £1

Waller M. D., 301 Walton D. J., 345 Watanabe T., 815 Wessels H. J., 297 Wessels F., 667 White M., 301

